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(FILE 'HOME' ENTERED AT 12:28:16 ON 03 MAR 1999)

FILE 'CAPLUS, CA, WPIDS' ENTERED AT 12:29:52 ON 03 MAR 1999

L1 41 S (MALTITOL CRYSTAL#) OR (CRYSTALLINE MALTITOL)  
L2 3 S L1 AND (CRYSTALLIZING OR CRYSTALLISING)  
L3 1 S L2 AND MALTOTRIITOL  
L4 7 S L1 AND MALTOTRIITOL  
L5 15 S L1 AND (CRYSTALLIZ? OR CRYSTALLIS?)  
L6 4 S L5 AND MALTOTRIITOL

=> d 16 1-4 ibib ab

L6 ANSWER 1 OF 4 CAPLUS COPYRIGHT 1999 ACS  
ACCESSION NUMBER: 1987:476127 CAPLUS  
DOCUMENT NUMBER: 107:76127  
TITLE: **Crystallized** maltitol  
INVENTOR(S): Devos, Francis; Gouy, Pierre Antoine  
PATENT ASSIGNEE(S): Roquette Freres S. A., Fr.  
SOURCE: Fr. Demande, 22 pp.  
CODEN: FRXXBL  
DOCUMENT TYPE: Patent  
LANGUAGE: French  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
FR 2575179	A1	19860627	FR 84-19600	19841220
FR 2575179	B1	19870206		
FI 8505063	A	19860621	FI 85-5063	19851218
FI 80705	B	19900330		
FI 80705	C	19900710		
DK 8505938	A	19860621	DK 85-5938	19851219
DK 162719	B	19911202		
DK 162719	C	19920511		
AU 8551546	A1	19860626	AU 85-51546	19851220
AU 594316	B2	19900308		
EP 189704	A1	19860806	EP 85-402587	19851220
EP 189704	B1	19900131		
R: BE, CH, DE, FR, GB, IT, LI, NL, SE				
JP 61180797	A2	19860813	JP 85-285911	19851220
JP 02011599	B4	19900314		
CA 1266645	A1	19900313	CA 85-498327	19851220
US 4846139	A	19890711	US 88-143275	19880106
PRIORITY APPLN. INFO.:			FR 84-19600	19841220
			US 85-810246	19851218

AB Crystd. maltitol is manufd. by successive steps of (1) enzymic saccharification of a starch suspension to produce a syrup contg. maltose 50-80% and preferably 60-80% by dry wt.; (2) catalytic hydrogenation of the maltose; (3) chromatog. of the maltitol syrup to obtain a fraction

(A) contg. 87-97.5% maltitol and <1%, preferably, <0.6%, polyols with a polymn. degree .gtoreq.4 and the remainder sorbitol and **maltotriitol**; (4) concn. of (A) and crystn. and sepn. of the **maltitol crystals**; and (5) rechromatog. etc. of the

mother liquor to quant. ext. the maltitol. Schematics are given for an suitable app. A starch slurry was liquified at 108.degree. and pH 6.3 with THERMAMYL enzymes in a 1st chamber and then saccharified with .beta.-amylase at 57.degree. for 48 h in the next chamber in the app.

The

syrup, contg. 61.3% maltose, was hydrogenated in a chamber contg. Raney nickel and H at 40-70 kg/m<sup>2</sup> pressure. The maltitol syrup was chromatographed at 90.degree. in a known manner through strong cationic resins, with a 2-step desorption in zone I, as adsorption in zone II, and a 5-step enrichment and sepn. of partially hydrogenated dextrans and **maltotriitol** in zone III. The maltitol was then concd. to 90% dry matter and cooled. Crystn. started at 75.degree. to give 99.5% pure **maltitol crystals**.

L6 ANSWER 2 OF 4 CA COPYRIGHT 1999 ACS  
ACCESSION NUMBER: 107:76127 CA  
TITLE: **Crystallized** maltitol  
INVENTOR(S): Devos, Francis; Gouy, Pierre Antoine  
PATENT ASSIGNEE(S): Roquette Freres S. A., Fr.  
SOURCE: Fr. Demande, 22 pp.  
CODEN: FRXXBL

	NUMBER	DATE
PATENT INFORMATION:	FR 2575179 A1	19860627
APPLICATION INFORMATION:	FR 84-19600	19841220
DOCUMENT TYPE:	Patent	
LANGUAGE:	French	

AB Crystd. maltitol is manufd. by successive steps of (1) enzymic saccharification of a starch suspension to produce a syrup contg. maltose 50-80% and preferably 60-80% by dry wt.; (2) catalytic hydrogenation of the maltose; (3) chromatog. of the maltitol syrup to obtain a fraction

(A) contg. 87-97.5% maltitol and <1%, preferably, <0.6%, polyols with a polymn. degree .gtoreq.4 and the remainder sorbitol and **maltotriitol**; (4) concn. of (A) and crystn. and sepn. of the **maltitol crystals**; and (5) rechromatog. etc. of the mother liquor to quant. ext. the maltitol. Schematics are given for an suitable app. A starch slurry was liquified at 108.degree. and pH 6.3 with THERMAMYL enzymes in a 1st chamber and then saccharified with .beta.-amylase at 57.degree. for 48 h in the next chamber in the app.

The

syrup, contg. 61.3% maltose, was hydrogenated in a chamber contg. Raney nickel and H at 40-70 kg/m<sup>2</sup> pressure. The maltitol syrup was chromatographed at 90.degree. in a known manner through strong cationic resins, with a 2-step desorption in zone I, as adsorption in zone II, and a 5-step enrichment and sepn. of partially hydrogenated dextrans and **maltotriitol** in zone III. The maltitol was then concd. to 90% dry matter and cooled. Crystn. started at 75.degree. to give 99.5% pure **maltitol crystals**.

L6 ANSWER 3 OF 4 WPIDS COPYRIGHT 1999 DERWENT INFORMATION LTD  
ACCESSION NUMBER: 86-206230 [32] WPIDS  
DOC. NO. CPI: C86-088617  
TITLE: Prepn. of **crystallised** maltitol - by enzymic saccharification of milk or starch catalytic hydrogenation chromatographic fractionation of the maltose syrup etc..  
DERWENT CLASS: D17 E17  
INVENTOR(S): DEVOS, F; GOUY, P A  
PATENT ASSIGNEE(S): (ROQF) ROQUETTE FRERES SA  
COUNTRY COUNT: 15  
PATENT INFORMATION:

PATENT NO KIND DATE WEEK LA PG

FR 2575179 A 860627 (8632)\* 22  
 EP 189704 A 860627 (8632) FR  
 R: BE CH DE FR GB IT LI NL SE  
 AU 8551546 A 860626 (8633)  
 DK 8505938 A 860621 (8638)  
 JP 61180797 A 860813 (8639)  
 FI 8505063 A 860621 (8643)  
 US 4846139 A 890711 (8935)  
 EP 189704 B 900131 (9005) FR  
 R: BE CH DE FR GB IT LI NL SE  
 DE 3575728 G 900308 (9011)  
 JP 02011599 B 900314 (9014)  
 CA 1266645 A 900313 (9018)

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
FR 2575179	A	FR 84-19600	841220
EP 189704	A	EP 85-402587	851220
JP 61180797	A	JP 85-285911	851220
US 4846139	A	US 88-143275	880106

PRIORITY APPLN. INFO: FR 84-19600 841220

AB FR 2575179 A UPAB: 930922

Prepn. of **crystallised** maltitol comprises:- (1) enzymic saccharification of a starch milk contg. 25-45% solids, the conditions (type and amt. of enzymes, temp. time of reaction, etc) being such that the maltose content of the obtd. syrup is 50-80 (60-80) wt.% w.r.t solids;

(2) Catalytic hydrogenation in known fashion; (3) Chromatographic fractionation of the maltitol syrup, the parameters being such that a fraction (A) is obtd. rich on maltitol having the following compsn in

wt.%. w.r.t solids:- 87-97.5 (87-96) wt.% of maltitol; less than 1% (pref. less than 0.6%) of polyols of D.P at least 4, balance being sorbitol and maltotriitol; (4) Concn. of the fraction (A) to a solids content suitable for permitting formation of **maltitol crystals**; (5)

**Crystallisation** and sepn. of **maltitol crystals** and (6) Recycling of the mother liquor of the **crystallisation** to the head of the chromatographic fractionation step, this recycling permitting an almost quantitative extraction of the maltitol formed during hydrogenation of the maltose syrup.

ADVANTAGE - The volumes to be treated are reduced. The energy required for water evaporation is markedly reduced. The liquefaction of the starch can be done at a dextrose equivalent greater than 2,

compatible with an absence of retrogradation of the starch. The use of enzymes such as isoamylase or pullulanase can be avoided. The high osmotic pressures caused by the high syrup concns. used protect the latter from any microbial contamination.

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L6 ANSWER 4 OF 4 WPIDS COPYRIGHT 1999 DERWENT INFORMATION LTD

ACCESSION NUMBER: 86-163560 [26] WPIDS

DOC. NO. CPI: C86-069972

TITLE: Prodn. of maltitol - by hydrogenation of maltose syrup followed by chromatographic fractionation.

DERWENT CLASS: B03 D13 D17 E13

INVENTOR(S): DEVOS, F; GOUY, P A; GOUY, P

PATENT ASSIGNEE(S): (ROQF) ROQUETTE FRERES SA

COUNTRY COUNT: 17

## PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG
EP 185595	A	860625	(8626)*	FR	30
R: BE CH DE FR GB IT LI NL SE					
FR 2575180	A	860627	(8632)		
AU 8551547	A	860626	(8633)		
DK 8505940	A	860621	(8638)		
JP 61180795	A	860813	(8639)		
BR 8506398	A	860902	(8642)		
FI 8505064	A	860621	(8643)		
US 4849023	A	890718	(8936)		
CA 1266644	A	900313	(9018)		
EP 185595	B	910403	(9114)		
R: BE CH DE FR GB IT LI NL SE					
DE 3582416	G	910508	(9120)		
KR 9303490	B1	930501	(9421)		
JP 2749570	B2	980513	(9824)		13
EP 185595	B2	981209	(9902)	FR	
R: BE CH DE FR GB IT LI NL SE					

## APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
EP 185595	A	EP 85-402588	851220
FR 2575180	A	FR 84-19601	841220
JP 61180795	A	JP 85-285912	851220
US 4849023	A	US 88-143273	880106
KR 9303490	B1	KR 85-9621	851220
JP 2749570	B2	JP 85-285912	851220
EP 185595	B2	EP 85-402588	851220

## FILING DETAILS:

PATENT NO	KIND	PATENT NO
JP 2749570	B2 Previous Publ.	JP 61180795

PRIORITY APPLN. INFO: FR 84-19601 841220

AB EP 185595 A UPAB: 930922

Simultaneous prodn. of a maltitol-rich prod. (I) and a **maltotriitol**-rich prod. (II) is effected by catalytically hydrogenating a syrup contg. at least 50% maltose and chromatographically fractionating the prod.

Pref. fractionation conditions are such that (I) contains, on a dry basis, at least 87 (esp. 87-95.5) wt.% maltitol, less than 1 (esp. less than 0.6) wt.% of polyols with a DP of 4 or more, less than 5 (esp. less than 2), wt.% sorbitol and 2.5-13% **maltotriitol**.

USE/ADVANTAGE - (I) is useful as a starting material for prodn. of **crystalline maltitol** or as a sweetener or humectant in foodstuffs, chewing gum, pharmaceutical prods., etc. The process gives a maltitol-rich syrup which is practically free of oligomers with a DP of 4 or more and contains very little sorbitol and **maltotriitol**.

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L1 41 S (MALтитол CRYSTAL#) OR (CRYSTALLINE MALтитол)  
L2 3 S L1 AND (CRYSTALLIZING OR CRYSTALLISING)  
L3 1 S L2 AND MALтитол  
L4 7 S L1 AND MALтитол

=> d 13 1 ibib ab

L3 ANSWER 1 OF 1 WPIDS COPYRIGHT 1999 DERWENT INFORMATION LTD  
ACCESSION NUMBER: 86-206230 [32] WPIDS  
DOC. NO. CPI: C86-088617  
TITLE: Prepn. of crystallised maltitol - by enzymic  
saccharification of milk or starch catalytic  
hydrogenation chromatographic fractionation of the  
maltose syrup etc..  
DERWENT CLASS: D17 E17  
INVENTOR(S): DEVOS, F; GOUY, P A  
PATENT ASSIGNEE(S): (ROQF) ROQUETTE FRERES SA  
COUNTRY COUNT: 15  
PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG
FR 2575179	A	860627	(8632)*		22
EP 189704	A	860806	(8632)	FR	
R: BE CH DE FR GB IT LI NL SE					
AU 8551546	A	860626	(8633)		
DK 8505938	A	860621	(8638)		
JP 61180797	A	860813	(8639)		
FI 8505063	A	860621	(8643)		
US 4846139	A	890711	(8935)		
EP 189704	B	900131	(9005)	FR	
R: BE CH DE FR GB IT LI NL SE					
DE 3575728	G	900308	(9011)		
JP 02011599	B	900314	(9014)		
CA 1266645	A	900313	(9018)		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
FR 2575179	A	FR 84-19600	841220
EP 189704	A	EP 85-402587	851220
JP 61180797	A	JP 85-285911	851220
US 4846139	A	US 88-143275	880106

PRIORITY APPLN. INFO: FR 84-19600 841220

AB FR 2575179 A UPAB: 930922

Prepn. of crystallised maltitol comprises:- (1) enzymic saccharification of a starch milk contg. 25-45% solids, the conditions (type and amt. of enzymes, temp. time of reaction, etc) being such that the maltose content of the obtd. syrup is 50-80 (60-80) wt.% w.r.t solids; (2) Catalytic

hydrogenation in known fashion; (3) Chromatographic fractionation of the maltitol syrup, the parameters being such that a fraction (A) is obtd. rich on maltitol having the following compsn in wt.% w.r.t solids:- 87-97.5 (87-96) wt.% of maltitol; less than 1% (pref. less than 0.6%) of polyols of D.P at least 4, balance being sorbitol and maltotriitol; (4) Concn. of the fraction (A) to a solids content suitable for permitting formation of **maltitol crystals**; (5) Crystallisation and sepn. of **maltitol crystals** and (6) Recycling of the mother liquor of the crystallisation to the head of the chromatographic fractionation step, this recycling permitting an almost quantitative extraction of the maltitol formed during hydrogenation of the maltose syrup.

ADVANTAGE - The volumes to be treated are reduced. The energy required for water evaporation is markedly reduced. The liquefaction of the starch can be done at a dextrose equivalent greater than 2, compatible with an absence of retrogradation of the starch. The use of enzymes such as isoamylase or pullulanase can be avoided. The high osmotic pressures caused by the high syrup concns. used protect the latter from any microbial contamination.

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L2 ANSWER 1 OF 3 WPIDS COPYRIGHT 1999 DERWENT INFORMATION LTD  
 ACCESSION NUMBER: 98-054834 [06] WPIDS  
 DOC. NO. CPI: C98-018950  
 TITLE: Manufacturing **crystalline maltitol** and crystalline solid containing maltitol - by catalytically hydrogenating maltose containing syrup to give sugar alcohol syrup and chromatographically separating with cation exchange resin.  
 DERWENT CLASS: B07 D13 D17 D21 E13  
 INVENTOR(S): MAGARA, M; OKAMOTO, N; TATENO, Y; YONEDA, S  
 PATENT ASSIGNEE(S): (TOAG) TOWA CHEM IND CO LTD; (TOAG) TOWA KASEI KOGYO KK  
 COUNTRY COUNT: 20  
 PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG
EP 816373	A1	980107	(9806)*	EN	21
R: AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE					
AU 9728349	A	980115	(9809)		
JP 10017589	A	980120	(9813)		14

# APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
EP 816373	A1	EP 97-110882	970702
AU 9728349	A	AU 97-28349	970627
JP 10017589	A	JP 96-194099	960705

PRIORITY APPLN. INFO: JP 96-194099 960705  
 AB EP 816373 A UPAB: 980209

Manufacturing **crystalline maltitol** and crystalline mixture solid containing maltitol comprises: (a) hydrogenating syrup with a maltose content of 40-75 wt.% in the solid component in the presence of a catalyst to obtain corresponding syrup of sugar alcohol; (b) chromatographically separating the sugar alcohol syrup by supplying to a column packed with a cation exchange resin to obtain: (b-i) high sorbitol content fraction, (b-ii) maltitol syrup fraction with a maltitol content

of 80.5-86.5 wt.% in the solid component, and (b-iii) polyol fraction having a degree of polymerisation (DP) of at least 3; (c) chromatographically separating the maltitol syrup fraction by supplying to a column packed with a cation exchange resin to obtain: (c-i) high sorbitol content fraction, (c-ii) second maltitol syrup fraction with a maltitol content of at least 97.5 wt.% in the solid component, and (c-iii) polyol fraction whose degree of polymerisation (DP) is at least 3; (d) **crystallising** after a concentration of syrup fraction (c-ii) and separating the maltitol from mother liquor with a maltitol content of at least 90 wt.% in the solid component and optionally (e) spray-drying or kneading the mother liquor under cooling in the presence of a seed crystal to obtain a crystalline mixture solid containing **crystalline maltitol**.

Catalytic hydrogenation is preferably effected in a continuous process by using a Raney nickel catalyst prepared by quenching molten nickel and aluminium and subjecting, in as manufactured form or after milling, to classification and activation, or a Raney catalyst prepared by forming a powder into pellets.

USE - The sorbitol and oligosaccharide fraction by-products may be used in commercially hydrogenated starch hydrolysate in food products, pharmaceuticals and cosmetics.

ADVANTAGE - The process is economical and produces high value added **crystalline maltitol** and crystalline mixture solid containing **crystalline maltitol** from cheap raw materials. The maltitol has a sweet taste and degree of sweetness similar to those of sucrose and does not cause tooth decay.  
Dwg.2/3

L2 ANSWER 2 OF 3 WPIDS COPYRIGHT 1999 DERWENT INFORMATION LTD  
 ACCESSION NUMBER: 96-499096 [50] WPIDS  
 DOC. NO. CPI: C96-155947  
 TITLE: Prodn. of **crystalline maltitol** from maltose syrup - by hydrogenation, chromatography and further processing.  
 DERWENT CLASS: B07 D13 D17 D21 E17  
 INVENTOR(S): KATAURA, K; KATO, K; MAGARA, M; ONUKI, Y; OSADA, Y; TATENO, Y; YAMAZAKI, F  
 PATENT ASSIGNEE(S): (TOAG) TOWA CHEM IND CO LTD; (TOAG) TOWA KASEI KOGYO KK  
 COUNTRY COUNT: 7  
 PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG
EP 741140	A1	961106	(9650)*	EN	16
R: DE FR GB IT NL					
AU 9651926	A	961114	(9702)		
JP 09019300	A	970121	(9713)		13
AU 694013	B	980709	(9838)		

#### APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
EP 741140	A1	EP 96-106725	960429
AU 9651926	A	AU 96-51926	960429
JP 09019300	A	JP 96-37074	960201
AU 694013	B	AU 96-51926	960429

#### FILING DETAILS:

PATENT NO	KIND	PATENT NO
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PRIORITY APPLN. INFO: JP 96-37074 960201; JP 95-131194 950502

AB EP 741140 A UPAB: 961211

Prodn. of **crystalline maltitol** and a

**crystalline maltitol**-contg. mixt. comprises: (1) catalytically hydrogenating a maltose syrup contg. 30-75 wt.% solids, of which 81-90 wt.% is maltose; (2) chromatographing the resulting sugar alcohol syrup on a column of cation-exchange resin to obtain a maltitol syrup whose solids comprise 92-99.9 (pref. 94-99.9) wt.% maltitol; and

(3) either: (a) concentrating the maltitol syrup, **crystallising** part of the conc. syrup in the presence of seed crystals to obtain **crystalline maltitol**, and spray-drying or cooling and kneading the rest of the conc. syrup in the presence of seed crystals to obtain the **crystalline maltitol**-contg. mixt.; (b) concentrating and **crystallising** part of the maltitol syrup, sepg. **crystalline maltitol** from mother liquor, mixing the mother liquor with the rest of the maltitol syrup, and concentrating and spray-drying or cooling and kneading the mixt. in the presence of

seed crystals to obtain the **crystalline maltitol**-contg. mixt.; or (c) concentrating and **crystallising** the maltitol syrup, sepg. **crystalline maltitol** from mother liquor, adding seed crystals to the mother liquor, and spray-drying or cooling

and kneading the mother liquor to obtain the **crystalline maltitol**-contg. mixt.

USE - The prods. are useful as sweeteners and as components of food, pharmaceutical and cosmetic prods.

ADVANTAGE - High yields are obtd. when the method is used, using inexpensive starting materials.

Dwg.0/0

L2 ANSWER 3 OF 3 WPIDS COPYRIGHT 1999 DERWENT INFORMATION LTD

ACCESSION NUMBER: 86-206230 [32] WPIDS

DOC. NO. CPI: C86-088617

TITLE: Prepn. of crystallised maltitol - by enzymic saccharification of milk or starch catalytic hydrogenation chromatographic fractionation of the maltose syrup etc..

DERWENT CLASS: D17 E17

INVENTOR(S): DEVOS, F; GOUY, P A

PATENT ASSIGNEE(S): (ROQF) ROQUETTE FRERES SA

COUNTRY COUNT: 15

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG
FR 2575179	A	860627	(8632)*		22
EP 189704	A	860806	(8632)	FR	
R: BE CH DE FR GB IT LI NL SE					
AU 8551546	A	860626	(8633)		
DK 8505938	A	860621	(8638)		
JP 61180797	A	860813	(8639)		
FI 8505063	A	860621	(8643)		
US 4846139	A	890711	(8935)		
EP 189704	B	900131	(9005)	FR	
R: BE CH DE FR GB IT LI NL SE					
DE 3575728	G	900308	(9011)		
JP 02011599	B	900314	(9014)		
CA 1266645	A	900313	(9018)		

APPLICATION DETAILS:



PATENT NO	KIND	APPLICATION	E
FR 2575179	A	FR 84-19600	841220
EP 189704	A	EP 85-402587	851220
JP 61180797	A	JP 85-285911	851220
US 4846139	A	US 88-143275	880106

PRIORITY APPLN. INFO: FR 84-19600 841220

AB FR 2575179 A UPAB: 930922

Prepn. of crystallised maltitol comprises:- (1) enzymic saccharification of a starch milk contg. 25-45% solids, the conditions (type and amt. of enzymes, temp. time of reaction, etc) being such that the maltose content of the obtd. syrup is 50-80 (60-80) wt.% w.r.t solids; (2) Catalytic hydrogenation in known fashion; (3) Chromatographic fractionation of the maltitol syrup, the parameters being such that a fraction (A) is obtd. rich on maltitol having the following compsn in wt.% w.r.t solids:- 87-97.5 (87-96) wt.% of maltitol; less than 1% (pref. less than 0.6%) of polyols of D.P at least 4, balance being sorbitol and maltotriitol; (4) Conc'n. of the fraction (A) to a solids content suitable for permitting formation of **maltitol crystals**; (5) Crystallisation and sepn. of **maltitol crystals** and (6) Recycling of the mother liquor of the crystallisation to the head of the chromatographic fractionation step, this recycling permitting an almost quantitative extraction of the maltitol formed during hydrogenation of

the

maltose syrup.

ADVANTAGE - The volumes to be treated are reduced. The energy required for water evaporation is markedly reduced. The liquefaction of the starch can be done at a dextrose equivalent greater than 2,

compatible

with an absence of retrogradation of the starch. The use of enzymes such as isoamylase or pullulanase can be avoided. The high osmotic pressures caused by the high syrup concns. used protect the latter from any microbial contamination.

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L4 ANSWER 1 OF 7 CAPLUS COPYRIGHT 1999 ACS

ACCESSION NUMBER: 1992:131527 CAPLUS

DOCUMENT NUMBER: 116:131527

TITLE: Molasses-containing **maltitol**

**crystals** and speedy production thereof

INVENTOR(S): Kawashima, Shigeru; Magara, Mitsuo; Ishii, Yoshibumi; Kato, Kazuaki

PATENT ASSIGNEE(S): Towa Chemical Industry Co., Ltd., Japan

SOURCE: PCT Int. Appl., 42 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9200309	A1	19920109	WO 91-JP690	19910523
W:	AT, AU, BB, BG, BR, CA, CH, DE, DK, ES, FI, GB, HU, JP, KR, LK, LU, MC, MG, MW, NL, NO, PL, RO, SD, SE, SU, US			
RW:	AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FR, GA, GB, GR, IT, LU, ML, MR, NL, SE, SN, TD, TG			
CA 2065301	AA	19911226	CA 91-2065301	19910523
AU 9178919	A1	19920123	AU 91-78919	19910523

AU 643528	B2	19931118		
EP 491953	A1	19920701	EP 91-9097	19910523
EP 491953	B1	19970423		
R: BE, DE, FR, GB, IT, NL				
JP 07014953	B4	19950222	JP 91-509213	19910523
JP 08280400	A2	19961029	JP 96-48453	19910523
US 5354856	A	19941011	US 92-836017	19920224
PRIORITY APPLN. INFO.:			JP 90-164148	19900625
			JP 91-53211	19910226
			JP 91-509213	19910523
			WO 91-JP690	19910523

AB The title crystals having relatively dense and broken structure which can be obsd. with a scanning electron microscope at magnification of x1000, a large apparent sp. gr. and low oil absorbance, are prepd. by continuously feeding an aq. soln. of maltitol (I) to an extruder provided with a slender cooling and kneading zones, where the soln. is cooled and kneaded in the presence of seed crystals to form magma of I, which is continuously extruded through nozzles.

L4 ANSWER 2 OF 7 CAPLUS COPYRIGHT 1999 ACS  
 ACCESSION NUMBER: 1987:476127 CAPLUS  
 DOCUMENT NUMBER: 107:76127  
 TITLE: Crystallized maltitol  
 INVENTOR(S): Devos, Francis; Gouy, Pierre Antoine  
 PATENT ASSIGNEE(S): Roquette Freres S. A., Fr.  
 SOURCE: Fr. Demande, 22 pp.  
 CODEN: FRXXBL  
 DOCUMENT TYPE: Patent  
 LANGUAGE: French  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
FR 2575179	A1	19860627	FR 84-19600	19841220
FR 2575179	B1	19870206		
FI 8505063	A	19860621	FI 85-5063	19851218
FI 80705	B	19900330		
FI 80705	C	19900710		
DK 8505938	A	19860621	DK 85-5938	19851219
DK 162719	B	19911202		
DK 162719	C	19920511		
AU 8551546	A1	19860626	AU 85-51546	19851220
AU 594316	B2	19900308		
EP 189704	A1	19860806	EP 85-402587	19851220
EP 189704	B1	19900131		
R: BE, CH, DE, FR, GB, IT, LI, NL, SE				
JP 61180797	A2	19860813	JP 85-285911	19851220
JP 02011599	B4	19900314		
CA 1266645	A1	19900313	CA 85-498327	19851220
US 4846139	A	19890711	US 88-143275	19880106
PRIORITY APPLN. INFO.:			FR 84-19600	19841220
			US 85-810246	19851218

AB Crystd. maltitol is manufd. by successive steps of (1) enzymic saccharification of a starch suspension to produce a syrup contg. maltose 50-80% and preferably 60-80% by dry wt.; (2) catalytic hydrogenation of the maltose; (3) chromatog. of the maltitol syrup to obtain a fraction (A) contg. 87-97.5% maltitol and <1%, preferably, <0.6%, polyols with a polymn. degree .gtoreq.4 and the remainder sorbitol and **maltotriitol**; (4) concn. of (A) and crystn. and sepn. of the **maltitol crystals**; and (5) rechromatog. etc. of the mother liquor to quant. ext. the maltitol. Schematics are given for an suitable app. A starch slurry was liquified at 108.degree. and pH 6.3

with THERMAMYL enzymes in a 1st chamber and then saccharified with .beta.-amylase 57.degree. for 48 h in the next chamber in the app.

The

syrup, contg. 61.3% maltose, was hydrogenated in a chamber contg. Raney nickel and H at 40-70 kg/m<sup>2</sup> pressure. The maltitol syrup was chromatographed at 90.degree. in a known manner through strong cationic resins, with a 2-step desorption in zone I, as adsorption in zone II, and a 5-step enrichment and sepn. of partially hydrogenated dextrans and **maltotriitol** in zone III. The maltitol was then concd. to 90% dry matter and cooled. Crystn. started at 75.degree. to give 99.5% pure **maltitol crystals**.

L4 ANSWER 3 OF 7 CA COPYRIGHT 1999 ACS

ACCESSION NUMBER: 116:131527 CA

TITLE: Molasses-containing **maltitol crystals** and speedy production thereof

INVENTOR(S): Kawashima, Shigeru; Magara, Mitsuo; Ishii, Yoshibumi; Kato, Kazuaki

PATENT ASSIGNEE(S): Towa Chemical Industry Co., Ltd., Japan

SOURCE: PCT Int. Appl., 42 pp.

CODEN: PIXXD2

	NUMBER	DATE
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PATENT INFORMATION:	WO 9200309 A1	19920109
DESIGNATED STATES:	W: AT, AU, BB, BG, BR, CA, CH, DE, DK, ES, FI, GB, HU, JP, KR, LK, LU, MC, MG, MW, NL, NO, PL, RO, SD, SE, SU, US	
	RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FR, GA, GB, GR, IT, LU, ML, MR, NL, SE, SN, TD, TG	
APPLICATION INFORMATION:	WO 91-JP690	19910523
PRIORITY APPLN. INFO.:	JP 90-164148	19900625
	JP 91-53211	19910226
DOCUMENT TYPE:	Patent	
LANGUAGE:	Japanese	

AB The title crystals having relatively dense and broken structure which can be obsd. with a scanning electron microscope at magnification of x1000, a large apparent sp. gr. and low oil absorbance, are prepd. by continuously feeding an aq. soln. of maltitol (I) to an extruder provided with a slender cooling and kneading zones, where the soln. is cooled and kneaded in the presence of seed crystals to form magma of I, which is continuously extruded through nozzles.

L4 ANSWER 4 OF 7 CA COPYRIGHT 1999 ACS

ACCESSION NUMBER: 107:76127 CA

TITLE: Crystallized maltitol

INVENTOR(S): Devos, Francis; Gouy, Pierre Antoine

PATENT ASSIGNEE(S): Roquette Freres S. A., Fr.

SOURCE: Fr. Demande, 22 pp.

CODEN: FRXXBL

	NUMBER	DATE
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PATENT INFORMATION:	FR 2575179 A1	19860627
APPLICATION INFORMATION:	FR 84-19600	19841220
DOCUMENT TYPE:	Patent	
LANGUAGE:	French	

AB Crystd. maltitol is manufd. by successive steps of (1) enzymic saccharification of a starch suspension to produce a syrup contg. maltose 50-80% and preferably 60-80% by dry wt.; (2) catalytic hydrogenation of the maltose; (3) chromatog. of the maltitol syrup to obtain a fraction

(A)

contg. 87-97.5% maltitol and <1%, preferably, <0.6%, polyols with a polymn. degree .gtoreq.4 and the remainder sorbitol and

maltotriitol; (4) concn. of (A) and crystn. and sepn. of the maltitol crystals and (5) rechromatog. etc. of mother liquor to quant. ext. the maltitol. Schematics are given for an suitable app. A starch slurry was liquified at 108.degree. and pH 6.3 with THERMAMYL enzymes in a 1st chamber and then saccharified with .beta.-amylase at 57.degree. for 48 h in the next chamber in the app.

The

syrup, contg. 61.3% maltose, was hydrogenated in a chamber contg. Raney nickel and H at 40-70 kg/m<sup>2</sup> pressure. The maltitol syrup was chromatographed at 90.degree. in a known manner through strong cationic resins, with a 2-step desorption in zone I, as adsorption in zone II, and a 5-step enrichment and sepn. of partially hydrogenated dextrans and maltotriitol in zone III. The maltitol was then concd. to 90% dry matter and cooled. Crystn. started at 75.degree. to give 99.5% pure maltitol crystals.

L4 ANSWER 5 OF 7 WPIDS COPYRIGHT 1999 DERWENT INFORMATION LTD  
 ACCESSION NUMBER: 86-206230 [32] WPIDS  
 DOC. NO. CPI: C86-088617  
 TITLE: Prepn. of crystallised maltitol - by enzymic saccharification of milk or starch catalytic hydrogenation chromatographic fractionation of the maltose syrup etc..  
 DERWENT CLASS: D17 E17  
 INVENTOR(S): DEVOS, F; GOUY, P A  
 PATENT ASSIGNEE(S): (ROQF) ROQUETTE FRERES SA  
 COUNTRY COUNT: 15  
 PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG
FR 2575179	A	860627	(8632)*		22
EP 189704	A	860806	(8632)	FR	
R: BE CH DE FR GB IT LI NL SE					
AU 8551546	A	860626	(8633)		
DK 8505938	A	860621	(8638)		
JP 61180797	A	860813	(8639)		
FI 8505063	A	860621	(8643)		
US 4846139	A	890711	(8935)		
EP 189704	B	900131	(9005)	FR	
R: BE CH DE FR GB IT LI NL SE					
DE 3575728	G	900308	(9011)		
JP 02011599	B	900314	(9014)		
CA 1266645	A	900313	(9018)		

# APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
FR 2575179	A	FR 84-19600	841220
EP 189704	A	EP 85-402587	851220
JP 61180797	A	JP 85-285911	851220
US 4846139	A	US 88-143275	880106

PRIORITY APPLN. INFO: FR 84-19600 841220

AB FR 2575179 A UPAB: 930922

Prepn. of crystallised maltitol comprises:- (1) enzymic saccharification of a starch milk contg. 25-45% solids, the conditions (type and amt. of enzymes, temp. time of reaction, etc) being such that the maltose content of the obtd. syrup is 50-80 (60-80) wt.% w.r.t solids; (2) Catalytic hydrogenation in known fashion; (3) Chromatographic fractionation of the maltitol syrup, the parameters being such that a fraction (A) is obtd. rich on maltitol having the following compsn in wt.% w.r.t solids:- 87-97.5 (87-96) wt.% of maltitol; less than 1% (pref. less than 0.6%) of

polyols of D.P at least 4, balance being sorbitol and maltotriitol; (4) Conc'n. of the fraction (A) to a solids content suitable for permitting formation of maltitol crystals; (5) Crystallisation and sepn. of maltitol crystals and (6) Recycling of the mother liquor of the crystallisation to the head of the chromatographic fractionation step, this recycling permitting an almost quantitative extraction of the maltitol formed during hydrogenation of the maltose syrup.

ADVANTAGE - The volumes to be treated are reduced. The energy required for water evaporation is markedly reduced. The liquefaction of the starch can be done at a dextrose equivalent greater than 2, compatible with an absence of retrogradation of the starch. The use of enzymes such as isoamylase or pullulanase can be avoided. The high osmotic pressures caused by the high syrup concns. used protect the latter from any microbial contamination.

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L4 ANSWER 6 OF 7 WPIDS COPYRIGHT 1999 DERWENT INFORMATION LTD  
 ACCESSION NUMBER: 86-163560 [26] WPIDS  
 DOC. NO. CPI: C86-069972  
 TITLE: Prodn. of maltitol - by hydrogenation of maltose syrup followed by chromatographic fractionation.  
 DERWENT CLASS: B03 D13 D17 E13  
 INVENTOR(S): DEVOS, F; GOUY, P A; GOUY, P  
 PATENT ASSIGNEE(S): (ROQF) ROQUETTE FRERES SA  
 COUNTRY COUNT: 17  
 PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG
EP 185595	A	860625	(8626)*	FR	30
R: BE CH DE FR GB IT LI NL SE					
FR 2575180	A	860627	(8632)		
AU 8551547	A	860626	(8633)		
DK 8505940	A	860621	(8638)		
JP 61180795	A	860813	(8639)		
BR 8506398	A	860902	(8642)		
FI 8505064	A	860621	(8643)		
US 4849023	A	890718	(8936)		
CA 1266644	A	900313	(9018)		
EP 185595	B	910403	(9114)		
R: BE CH DE FR GB IT LI NL SE					
DE 3582416	G	910508	(9120)		
KR 9303490	B1	930501	(9421)		
JP 2749570	B2	980513	(9824)		13
EP 185595	B2	981209	(9902)	FR	
R: BE CH DE FR GB IT LI NL SE					

# APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
EP 185595	A	EP 85-402588	851220
FR 2575180	A	FR 84-19601	841220
JP 61180795	A	JP 85-285912	851220
US 4849023	A	US 88-143273	880106
KR 9303490	B1	KR 85-9621	851220
JP 2749570	B2	JP 85-285912	851220
EP 185595	B2	EP 85-402588	851220

# FILING DETAILS:

PATENT NO	KIND	PATENT NO
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PRIORITY APPLN. INFO: FR 84-19601 841220

AB EP 185595 A UPAB: 930922

Simultaneous prodn. of a maltitol-rich prod. (I) and a **maltotriitol**-rich prod. (II) is effected by catalytically hydrogenating a syrup contg. at least 50% maltose and chromatographically fractionating the prod.

Pref. fractionation conditions are such that (I) contains, on a dry basis, at least 87 (esp. 87-95.5) wt.% maltitol, less than 1 (esp. less than 0.6) wt.% of polyols with a DP of 4 or more, less than 5 (esp. less than 2), wt.% sorbitol and 2.5-13% **maltotriitol**.

USE/ADVANTAGE - (I) is useful as a starting material for prodn. of **crystalline maltitol** or as a sweetener or humectant in foodstuffs, chewing gum, pharmaceutical prods., etc. The process gives a maltitol-rich syrup which is practically free of oligomers with a DP of 4 or more and contains very little sorbitol and **maltotriitol**.  
0/2

L4 ANSWER 7 OF 7 WPIDS COPYRIGHT 1999 DERWENT INFORMATION LTD

ACCESSION NUMBER: 83-798889 [43] WPIDS

DOC. NO. CPI: C83-103894

TITLE: Pulverised reduced maltose syrup prodn. - involves concn.

of the syrup, addn. of maltitol and **maltotriitol** crystals and then pulverising.

DERWENT CLASS: D13

PATENT ASSIGNEE(S): (NIKM) NIKKEN CHEM KK

COUNTRY COUNT: 1

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG
JP 58158145	A	830920	(8343)*		4
JP 01047140	B	891012	(8945)		

## APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
JP 58158145	A	JP 82-39326	820315

PRIORITY APPLN. INFO: JP 82-39326 820315

AB JP58158145 A UPAB: 930925

In the process, a reduced maltose syrup is concentrated, crystals or maltitol and **maltotriitol** are added into the concentrate as crystal-seed, and the formed crystal is made into a powder by a usual method.

Reduced maltose syrup is composed mainly of maltitol and also contains appreciable amts. of sorbitol, **maltotriitol** and dextrin alcohol. It has mild sweetness and is used in dietary food because its essential component, maltitol, is a low-calorie sugar. Reduced maltose syrup has formerly been difficult to turn into a powder, but the present method affords pulverised (I).

The raw reduced maltose syrup contains more than 50 wt.% maltitol and more than 10 wt.% **maltotriitol**.  
0/1